



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Applicant : Hironori OSUGA
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Examiner : Robert E. Sellers
Group Art Unit : 1712
For : EPOXY RESIN COMPOSITION AND
SEMICONDUCTOR APPARATUS

**RESPONSE TO RESTRICTION REQUIREMENT
AND ELECTION OF SPECIES REQUIREMENT**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the Office Action mailed April 4, 2006, please consider the following remarks.

The Office Action sets forth both a Restriction Requirement and an Election of Species Requirement.

I. Restriction Requirement

Claims 1-6 are pending herein. The Office Action requires restriction as between the following groups of claims:

- I. Claims 1 and 2, drawn to a composition comprising spherical alumina, ultrafine silica, a silicone compound, an epoxy resin, a phenolic resin curing agent and a curing accelerator, classified in class 523, subclass 457;
- II. Claims 3 and 4, drawn to a semiconductor apparatus wherein a semiconductor element mounted on one side of a substrate is encapsulated with the composition, classified in class 257, subclass 789; and

III. Claims 5 and 6, drawn to a method of encapsulating a semiconductor apparatus comprising encapsulating one side of a substrate of a semiconductor mounted on one side of a substrate with the composition, classified in class 438, subclass 127.

Applicant hereby elects, with traverse, to prosecute the claims of Group I, i.e., claims 1 and 2, drawn to the composition.

The inventions of Groups I, II and III have in common both industrial applicability (semiconductors) and the problems to be solved, e.g., the occurrence of warping after molding, the necessity to dissipate the heat generated from the semiconductor device to the outside of the package through the encapsulating epoxy resin, moldability problems, and the need for resistance to soldering crack and to thermal conductivity. The instant specification teaches that:

[a]ccording to the present invention, it has been found that an epoxy resin composition for semiconductor encapsulation which has excellent moldability, low molding shrinkage, high resistance to temperature cycle, high soldering crack resistance and high thermal conductivity can be obtained by using a spherical alumina and a specific ultrafine silica at a specific ratio and further a silicone compound. That is, the present invention relates to an *epoxy resin composition for semiconductor encapsulation which comprises, as essential components, (A) a spherical alumina, (B) an ultrafine silica having a specific surface area of 120-280 m²/g, (C) a silicone compound, (D) an epoxy resin, (E) a phenolic resin curing agent, and (F) a curing accelerator, said ultrafine silica being contained in an amount of 0.2-0.8% by weight based on the total weight of the resin composition . . . [emphasis added]* (page 5, lines 3-19)

Thus, the specification teaches that the composition set forth in claim 1 provides the advantages associated with the present invention.

The invention of Group II (semiconductor apparatus) relies on the specific properties of the composition of Group I, because the composition encapsulates the side of the substrate on which a semiconductor element is mounted. Likewise, the invention of Group III (method) uses the composition of claim 1 to encapsulate one side of a substrate of the semiconductor mounted on the substrate. In other words, the focus of all three groups of claims is the composition of Group I. Thus, patentability searches conducted for the three groups of claims will involve at least one common area of search, namely, that of the composition. Accordingly, Applicant

respectfully submits that the combination of searches for the three groups of claims would not pose a serious burden. According to MPEP §803:

If the search and examination of all the claims in an application can be made without serious burden, the examiner must examine them on the merits, even though they include claims to independent or distinct inventions.

Thus, Applicant respectfully requests that the restriction requirement be withdrawn and claims 1-6 be examined in a single application.

II. Election of Species Requirement

According to the Office Action, claims 1-6 are generic to the following patentably distinct species:

(C) The silicone compounds described on page 7, line 18 to page 8, line 11 of the specification, such as the silicone rubber without organic substituents having an affinity with epoxy resins and phenolic resins used in Example 1 on page 11;

(D) The epoxy resins such as the o-cresol novolac epoxy resin employed in Example 1; and

(F) The curing accelerators such as the triphenylphosphine utilized in Example 1.

The Office Action requires Applicant to elect a species within each of items (C), (D) and (F) set forth above. Applicant hereby elects to prosecute the following species:

(C) a silicone oil;

(D) o-cresol novolac epoxy resin (used in Examples 1-9); and


(F) triphenylphosphine (used in Examples 1-9).

Claims readable on the elected species are claims 3-6.

If any fees under 37 C. F. R. §§ 1.16 or 1.17 are due in connection with this filing, please charge the fees to Deposit Account No. 02-4300, Order No. 033036M073.

Respectfully submitted,
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